

REMARKS

Upon entry of the present amendment, claims 1 and 27 will be amended, so that claims 1-27 will remain pending.

Claim 1 has been amended to consistently use the terminology at least one smoothing layer and to more explicitly recite transparent ceramic layers, and a period has been added to claim 27. Accordingly, no estoppel should be considered to be presented by this amendment.

Reconsideration of the rejections of record and allowance of the application in view of the following remarks are respectfully requested.

Claim of Foreign Priority

The Office Action does not acknowledge the claim of foreign priority nor receipt of the certified copy of the priority application. Therefore, Applicants request that the next communication from the Patent and Trademark Office acknowledge the claims of foreign priority as well as receipt of the certified copy of the priority application in this national stage application.

Information Disclosure Statement

Applicants express appreciation for the Examiner's confirmation of consideration of Applicant's Information Disclosure Statement by including an initialed copy of the Form PTO-1449 submitted therewith with the Office Action.

Response To Rejections Based Upon Prior Art

The following art based rejections are set forth in the Office Action.

(a) Claims 1, 2, 5-7, 9-14, 17, 19-21 and 23-26 are rejected under 35 U.S.C. 102(a) [apparently should be 102(b)] as being anticipated by U.S. Patent No. 6,613,393 to Rauschnabel et al. (hereinafter “Rauschnabel ‘393”)

(b) Claims 1, 2, 5-7, 9-14, 17, 19-21 and 23-26 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 99/63129 to Rauschnabel et al. (which is the corresponding International Application of U.S. Patent No. 6,613,393 – and hereinafter “Rauschnabel ‘129”).

(c) Claims 3, 4, 8, 22 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,613,393 or WO 99/63129 to Rauschnabel et al. (hereinafter collectively referred to as “Rauschnabel”) in view of WO 03/048406 A2 to Landgraf et al. (hereinafter “Landgraf”) with US 2005/0040034 A1 being used as English translation.

(d) Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,613,393 or WO 99/63129 to Rauschnabel et al. in view of U.S. Patent No. 5,464,710 to Yang.

(e) Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,613,393 or WO 99/63129 to Rauschnabel et al. in view of U.S. Patent No. 4,715,319 to Bringmann et al. (hereinafter “Bringmann”)

(f) Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,613,393 or WO 99/63129 to Rauschnabel et al. in view of U.S. Patent No. 4,619,865 to Keem et al. (hereinafter “Keem”)

In response to these grounds of rejection, Applicants submit that Rauschnabel does not teach each and every feature recited in Applicants’ claims so as to constitute anticipation.

Moreover, one having ordinary skill in the art would not have combined the disclosures of the documents in the manner asserted in the rejections. Moreover, even if for the sake of argument the disclosures were combined, Applicants' claimed subject matter would not have been arrived at. Moreover, any combination of the prior art would not achieve the advantages associated with Applicants' claimed subject matter.

Applicants' independent claim1 is directed to a method for producing an ultrabarrier layer system comprising vacuum coating on a substrate a layer stack comprising an alternating layer system of at least one smoothing layer and transparent ceramic layers, and comprising the at least one smoothing layer between two transparent ceramic layers, which transparent ceramic layers are applied by sputtering, and a monomer is admitted into an evacuated coating chamber in which a magnetron plasma is operated during deposition of the at least one smoothing layer.

In contrast, Rauschnabel '393 and Rauschnabel '129, which include the same contents, and will be referenced with respect to Rauschnabel '393, are not directed to a method for producing an ultrabarrier layer system.

Ultrabarrier layer system

The rejection contends that Rauschnabel teaches a method for producing an ultrabarrier layer system. In contrast, Rauschnabel is directed to methods for producing **wear protection** layers and the resulting layer systems. For example, the title of Rauschnabel is "Method for Applying a Wear Protection Layer System Having Optical Properties Onto Surfaces". A wear protection layer is not inherently a barrier layer, and a barrier layer is not inherently a wear protection layer. The requirements for a wear protection layer are different from the requirements for a barrier layer. Consequently the properties of a wear protection layer are different from the

properties of a barrier layer, and the rejection improperly does not address that Rauschnabel discloses a wear protection layer and not an ultrabarrier layer as recited by Applicants.

Differences of the two layers are readily apparent for one having ordinary skill in the art. For example, important requirements for a wear protection layer are high scratch resistance and low abrasion. The problem for a wear resistant layer is to find a useful compromise between high hardness and high flexibility of the layer. In contrast, the most important requirement for a barrier layer is a low permeation of oxygen and water vapor, as seen, for example, the third full paragraph on page 1 of Applicants' application. Consequently, the requirement for a good barrier is to find a layer or a layer structure with a low defect density. In fact, requirements for an ultrabarrier layer or ultrabarrier layer system are high, and are specified within the meaning of the invention in the fourth full paragraph on page 1 of Applicants' application.

There does not appear to be any disclosure in Rauschnabel, either explicitly or implicitly, that his disclosed layers meet requirements of an ultrabarrier layer system, including any indication that the layers or layer systems of Rauschnabel have a permeation barrier against oxygen and water vapor to constitute an ultrabarrier layer as recited by Applicants.

Ceramic layer

Rauschnabel discloses at column 3, line 60 to column 4, line 15, the depositing of a wide range of layer materials (such as oxides, silicides, carbides, borides, nitrides, sulfides, fluorides, selenides, tellurides ...) by sputtering to realize an UV protective layer. However, Rauschnabel does not appear to disclose the deposition of at least two transparent **ceramic** layers by sputtering to obtain an ultrabarrier layer system.

Transparent layer

Applicants' independent claim 1 includes, amongst the other recitations included therein, two transparent ceramic layers, which transparent layers are applied by sputtering. In the range of materials disclosed in Rauschnabel for the deposition by sputtering it is possible to retain at least silver, golden, yellow, red and green layers. It does not appear that Rauschnabel discloses at least two **transparent** ceramic layers by sputtering in an ultrabarrier layer system.

Smoothing layer

Applicants' independent claim 1 further includes an alternating layer system of at least one smoothing layer and transparent ceramic layers, and comprising at least one smoothing layer between two transparent ceramic layers, which transparent layers are applied by sputtering, and a monomer is admitted into an evacuated coating chamber in which a magnetron plasma is operated during deposition of the at least one smoothing layer. For example, attention is directed to Applicants' application to the paragraph beginning on page 6 and continuing thereafter. Such a smoothing layer prevents the growth of defects in the ceramic layers from continuing over several layers.

The only kinds of layers disclosed in Rauschnabel are UV protective layers and wear protective layers. It does not appear that Rauschnabel discloses that any of these layers is structured and/or arranged to prevent growth of defects in a ceramic layer from continuing over several layers. Consequently, it does not appear that Rauschnabel teaches or suggests smoothing layers.

Additionally, Applicants' independent claim 1 further recites that a monomer is admitted into an evacuated coating chamber in which a magnetron plasma is operated during deposition of the at least one smoothing layer.

Still further, the at least one smoothing layer is deposited under the influence of a **magnetron plasma**. For building a magnetron plasma a low pressure level in a vacuum chamber is required. In contrast, Rauschnabel discloses two kinds of layer systems for wear protection and two different apparatus for the deposition of the two kinds of layer systems.

A first layer structure is shown in Fig. 1 of Rauschnabel. This layer structure includes a single wear protection layer 11 which includes sputtered particles 12, with Rauschnabel disclosing, at column 6, lines 21-22 (bolded emphasis added), "...having a layer structure in the case of simultaneous operation of the sputtering and **microwave sources**." An apparatus for the deposition of such a single layer is shown in Fig. 3. This apparatus includes a reaction chamber 36 in which simultaneously is sputtered a target 35 for the particles 12 in layer 11 and a silicon monomer (fed by supply line 37 into chamber 36) and is activated by a **microwave plasma** and forms most of layer 11 by a CVD process. Therefore, Rauschnabel discloses a microwave plasma in chamber 36 and not a magnetron plasma. See, for example, RAUSCHNABEL, column 6, lines 62 – 64 (with bolded emphasis added), "**A microwave generator 33 that generates the plasma** is mounted in the vicinity of the substrate".

A second layer structure is shown in Fig. 2 of Rauschnabel. This is a multilayer structure where wear protective layers 21 and UV protective layers 22 alternate. An apparatus for the deposition of such a layer system is shown in Figs. 4 and 5 of Rauschnabel. This is a multi-chamber facility and comprises four chambers which are separated from each other. Two

chambers comprise PECVD facilities for the deposition of the layers 21 and two chambers comprise sputter systems for the deposition of the layers 22.

It is not possible to deposit the single mixed layer 11 from Fig. 1 with an apparatus shown in Fig. 4 and 5 because of the separated chambers; and it is not possible to deposit a layer system from Fig. 2 with an apparatus shown in Fig. 3 because the sputtering of a layer which consists only of sputtered particles (like layers 22) requires a low pressure level in the chamber and the deposition of a layer as an result of a microwave plasma enhanced CVD process (like layers 21) requires a high pressure level in the chamber. It is not possible to switch the different pressure levels in chamber 36 for the deposition of the different layers in the required time to deposit such a layer system.

Applicants' claims are patentable at least for the above-noted deficiencies in Rauschnabel. Moreover, the dependent claims are patentable at least for the reasons set forth above, and for the additional features recited in the dependent claims in combination with the features from which the claims depend.

The other documents used in the rejections of record do not overcome the deficiencies of Rauschnabel. Landgraf is merely used is an obviousness rejection for magnetron plasma features. However, whether or not one having ordinary skill in the art would have combined the disclosures of Rauschnabel and Landgraf, which Applicants submit would not be combinable, Applicants' claimed subject matter would not be at hand at least because any such combination does not overcome the deficiencies of Rauschnabel.

Yang is merely used in an obviousness rejection for coating a web with a monomer. However, whether or not one having ordinary skill in the art would have combined the disclosures of Rauschnabel and Yang, which Applicants submit would not be combinable,

Applicants' claimed subject matter would not be at hand at least because any such combination does not overcome the deficiencies of Rauschnabel.

Bringmann is merely used in an obviousness rejection for its disclosure of keeping the substrate at 35 degrees C during the coating process. However, whether or not one having ordinary skill in the art would have combined the disclosures of Rauschnabel and Bringmann, which Applicants submit would not be combinable, Applicants' claimed subject matter would not be at hand at least because any such combination does not overcome the deficiencies of Rauschnabel.

Keem is merely used in an obviousness rejection for its disclosure that layers should range from 50 Angstroms to 5,000 Angstroms. However, whether or not one having ordinary skill in the art would have combined the disclosures of Rauschnabel and Keem, which Applicants submit would not be combinable, Applicants' claimed subject matter would not be at hand at least because any such combination does not overcome the deficiencies of Rauschnabel.

Moreover, regarding claim 2, Rauschnabel does not disclose a **magnetron plasma** operated in a pulsed manner with a pulse frequency of 1 kHz to 300 kHz. The citation of Rauschnabel referenced in the rejection relates to a microwave plasma and not to a magnetron plasma.

Moreover, regarding claim 20, HMDSO in Rauschnabel (Column 2 lines 14 – 15) relates only to plasma polymerization and not to magnetron sputtering. See Rauschnabel (Column 2 lines 2 – 20). Still further, Rauschnabel (Column 4 lines 21 – 28) cites only gases which can be in a chamber during sputtering. Nowhere does Rauschnabel disclose alternating inlet of two gases in a chamber during sputtering.

Still further, claims 9 and 10 include that the deposition of the transparent ceramic layers takes place through magnetron sputtering. However, the rejection does not establish such features let alone such features in combination with independent claim 1.

Accordingly, at least for the reasons set forth above, the rejections of record should be withdrawn.

CONCLUSION

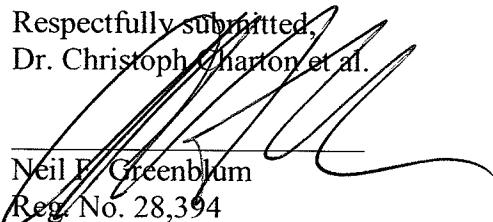
In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections of record, and allow each of the pending claims.

Applicant therefore respectfully requests that an early indication of allowance of the application be indicated by the mailing of the Notices of Allowance and Allowability.

Should the Examiner have any questions regarding this application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
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